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LADAS & PARRY LLP

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JAN 31 2006

Application Serial No. 10/811,728  
Revised Appeal Brief dated January 31, 2006

PATENT  
DOCKET: CU-3663

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Hiroyuki TAKAMURA )  
SERIAL NO: 10/811,728 ) Group Art Unit: 3748  
FILED: March 29, 2004 ) Examiner: Ching CHANG  
TITLE: VALVE TRAIN FOR INTERNAL COMBUSTION ENGINE

### Certification under 37 C.F.R. §1.8(b)

The USPTO Central Fax No. (571) 273-8300

Date of Fax Transmittal: January 31, 2006

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted to the United States Patent and Trademark Office to the fax number and on the date indicated above.

  
Brian W. Hameder, Reg. No. 45,613

**Mail Stop Appeal Briefs – Patent**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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#### **Grounds of Rejection to be Reviewed on Appeal**

1. Whether Claim 1 is properly rejected under 35 U.S.C. §103(a) as being unpatentable over Sada (U.S. Patent No. 5,997,988) in view of Nishioka et al. (U.S. Patent No. 6,367,439)?

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Claim 1 is the only pending claim.

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The Examiner contends that 'the Sada reference discloses "the present invention is applicable to all machine parts each having a contact surface which enters a state of at least one of rolling contact and sliding contact with the other part opposite thereto" (See Col. 5, line 36 through line 39), and the contact surface having a maximum circumference surface roughness in 1.4 or 1.1  $\mu\text{m}$  (See Table 1). Accordingly, the Examiner deems that the Sada reference teaches each of the cam lobe and the roller in Claim 1, having the claimed subject matter of surface roughness 0.4 to 2.2  $\mu\text{m}$ .' (See the Advisory Action issued July 25, 2005 – Continuation Sheet of 11.). In contrast, the Applicant contends that Sada does not disclose or suggest both machine parts (cam lobe and roller follower) contact surfaces having a surface roughness  $R_a$  of 0.4 to 2.2  $\mu\text{m}$ , as claimed.

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Also, as referred to above with regard to the function of the invention disclosed in Sada, the function of the prescribed surface roughness is to obtain an oil film controlled by the small recesses in the surface of the machine parts. This purpose is a function of the maximum height  $R_y$  surface roughness which is dependent upon and limited by the ratio of the peak height  $R_p$  and the valley depth  $R_v$  ( $R_p/R_v$ , See Figure 1 in Sada). Sada further describes that invention as being applicable to both rolling contact and sliding contact. The goal of that invention is to reduce wear on the machine parts by the formation of the oil film. In contrast, the function of the present invention is to provide only rolling contact between two machine parts without the formation of an oil film. From the stated purpose and function of Sada, the Applicant contends that there would be no motivation to further modify the invention of Sada to perform a different function. No disclosure, teaching or suggestion of such a modification of the function of the device is present, let alone the claimed features of both machine parts having a specified surface roughness.

The Applicant further considers that even if  $R_a$  of the present application were equal to  $R_y$  of Sada, that Sada teaches away from using the claimed surface roughness, notwithstanding the fact that Sada teaches  $R_y$  equals 3  $\mu\text{m}$  on the second machine part contact surface. Table 1 in Sada shows a  $R_y$  value in comparative example 3 within the assumed claimed range that yields a negative result, and a  $R_y$  value in embodiment 3 outside the assumed claimed range that

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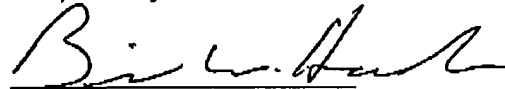
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### Conclusion

For the reasons given above, the Appellant respectfully submits that neither the relied upon cited references of Sada and Nishioka et al. disclose, teach or suggest the claimed features of both the cam lobe and roller follower having a surface roughness  $R_a$  of 0.4 to 2.2  $\mu\text{m}$ . The Appellant thus considers that the Examiner has not met the burden required under 35 U.S.C. §103(a) of proving obviousness in view of these references. Accordingly, the Appellant respectfully requests the Board to reverse the Examiner's rejection of Claim 1, and requests allowance of the application.

January 31, 2006  
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Respectfully submitted,



Attorney for Applicant  
Brian W. Hameder  
c/o Ladas & Parry LLP  
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Chicago, Illinois 60604  
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## **APPENDIX**

### **Listing of Claims:**

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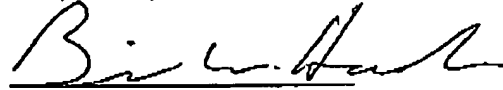
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As referred to above, the Examiner also contends that the disclosed maximum height surface roughness  $R_y$  in Sada is equivalent to the claimed surface roughness  $R_a$ , which is well understood by persons skilled in the art to be the arithmetic mean surface roughness. In support of the Applicant's assertion of the well known definition of  $R_a$ , Applicant previously submitted an English translation of Japanese Industrial Standard B 0601 which defines  $R_a$  as the arithmetic mean roughness. As shown in Figure 9 of JIS B 0601,  $R_a$  is the average of a series of consecutive peak to valley vertical distances over a sample length of a surface. This value of  $R_a$  necessarily would be less than  $R_y$  which is defined in Sada as the vertical distance between the greatest peak height and the greatest valley height over a sample length of a surface, as shown in Figure 1 of Sada. Thus, Sada does not disclose the claimed  $R_a$  surface roughness values.

Also, as referred to above with regard to the function of the invention disclosed in Sada, the function of the prescribed surface roughness is to obtain an oil film controlled by the small recesses in the surface of the machine parts. This purpose is a function of the maximum height  $R_y$  surface roughness which is dependent upon and limited by the ratio of the peak height  $R_p$  and the valley depth  $R_v$  ( $R_p/R_v$ , See Figure 1 in Sada). Sada further describes that invention as being applicable to both rolling contact and sliding contact. The goal of that invention is to reduce wear on the machine parts by the formation of the oil film. In contrast, the function of the present invention is to provide only rolling contact between two machine parts without the formation of an oil film. From the stated purpose and function of Sada, the Applicant contends that there would be no motivation to further modify the invention of Sada to perform a different function. No disclosure, teaching or suggestion of such a modification of the function of the device is present, let alone the claimed features of both machine parts having a specified surface roughness.

The Applicant further considers that even if  $R_a$  of the present application were equal to  $R_y$  of Sada, that Sada teaches away from using the claimed surface roughness, notwithstanding the fact that Sada teaches  $R_y$  equals 3  $\mu\text{m}$  on the second machine part contact surface. Table 1 in Sada shows a  $R_y$  value in comparative example 3 within the assumed claimed range that yields a negative result, and a  $R_y$  value in embodiment 3 outside the assumed claimed range that



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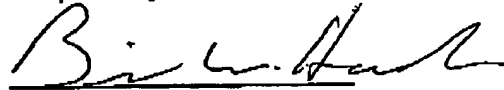
yields a positive result. This is completely contradictory to the two examples chosen by the Examiner, and further emphasizes that for the purposes of the invention of Sada,  $R_y$  is not the determinative value. That being the case, Sada would teach away from the present Claim 1 if both functioned in the same way to produce the same result.

With regard to the cited reference Nishioka et al., this reference is relied upon to provide an example in the prior art where a sintered material is used to manufacture machine parts. This reference is not relied upon by the Examiner, nor considered by the Applicant, to disclose the claimed features of both the cam lobe and roller follower having the prescribed surface roughness of  $R_a$ .

### Conclusion

For the reasons given above, the Appellant respectfully submits that neither the relied upon cited references of Sada and Nishioka et al. disclose, teach or suggest the claimed features of both the cam lobe and roller follower having a surface roughness  $R_a$  of 0.4 to 2.2  $\mu\text{m}$ . The Appellant thus considers that the Examiner has not met the burden required under 35 U.S.C. §103(a) of proving obviousness in view of these references. Accordingly, the Appellant respectfully requests the Board to reverse the Examiner's rejection of Claim 1, and requests allowance of the application.

Respectfully submitted,



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### **APPENDIX**

#### **Listing of Claims:**

1. (previously amended) A valve train for an internal combustion engine comprising a cam lobe fixed on a cam shaft and a roller follower provided with a roller to come in rotation-contact with the cam lobe, wherein the cam lobe is made of an iron based sintered material, and the surface roughness  $R_a$  of the outer circumferential surface thereof is 0.4 to 2.2  $\mu\text{m}$ , and the surface roughness  $R_a$  of the outer circumferential surface of the roller is 0.4 to 2.2  $\mu\text{m}$ .
2. (cancelled)
3. (cancelled)
4. (cancelled)

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